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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 10/777,842
Filing Date: February 12, 2004
Appellant(s): SEILER ET AL.

Christopher J. Reckamp
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 12/17/2007 appealing from the Office action mailed 12/29/2006.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

6,476,807	DULUK, Jr. ET AL.	11-2002
2004/0169651	EVERITT ET AL.	9-2004
2003/0030642	CHEN ET AL.	2-2003

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

Claims 1-3, 5 and 7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chen et al (US 2003/0030642) in view of Jouppi et al (6,204,859).

Claim 1, Chen discloses (Figs. 1 and 2) a graphics processor, comprising: a rasterizer (rasterizer chip 16) operative to generate fragment data for a pixel to be rendered in response to primitive information (Page 1, section 16, lines 3-7); a pixel appearance determination circuit (Fig. 2, memory chip 10 having a logic core 50), coupled to the rasterizer (16), for determining which bits are least important to the texture representation and eliminated those bits (Page 3, section 25, lines 9-11).

Chen fails to disclose the dropping the fragment data with a "no color" designation.

However, Jouppi discloses (Figs. 4 and 5) a method for determining the appearance of a pixel (300), comprising:

receiving fragment data (301,302 and 400) for a pixel (300) to be rendered; storing the fragment data in the pixel memory (314); and

determining an appearance value for the pixel based on the stored fragment data, wherein (Fig. 5C) at least one of the stored fragment data (310) is dropped when the number of fragment data per pixel exceeds a threshold value (N=2). Fig. 5C shows the fragment triple data (410) replaces the fragment triple data (310). See column 7, lines 37-67; column 8, lines21-28; and column 9, lines 26-37.

Jouppi further teaches dropping the fragment data with a no color designation (completely transparency) (Column 15, lines 28-33).

Therefore, it would have been obvious to the person of ordinary skill in the art to use the method of dropping a "no color" fragment data of Jouppi into the graphics processor of Chen to reduce the amount of time spent rendering the pixels and decreases the memory space for storing the fragment data.

Claim 2.

Chen further discloses (Fig. 2) the determination circuit is a combined memory and logic chip for storing the fragment data (Page 1, section 8; and page 2, section 19, lines 1-11; and section 22, lines 1-8).

Claims 3 and 7.

Chen fails to teach dropping one of the fragment data when the fragment data exceeds a predetermined value N.

However, Jouppi discloses (Fig. 5C) the determination of an appearance value for the pixel based on the stored fragment data, wherein at least one of the stored fragment data (310) is dropped when the number of fragment data per pixel exceeds a threshold value (N=2). Fig. 5C shows the fragment triple data (410) replaces the fragment triple data (310). Jouppi further discloses (Fig. 6D) the threshold value is N=3 (310, 312 and 410). See column 7, lines 37-67; column 8, lines 21-28; and column 9, lines 26-37.

Claim 5.

Chen discloses (Fig. 1) a setup unit (a geometry chip 14) operative to generate the primitive information in response to vertex information (Page 1, section 16, lines 1-7).

Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen in view of Jouppi as applied to claim 1 above, and further in view of Everitt.

Claim 8.

Chen fails to explicitly teach that "wherein the masked sample data is not dropped, and wherein the masked sample data is used to determine the appearance value for the pixel.

However, Everitt discloses (Figs. 1 and 4) a graphics processor having a rasterization pipeline (400) for determining a pixel appearance value (depth value)

based on the fragment data by dropping the fragment data having the least effect on pixel appearance (if the depth values are outside the depth bounds, then the pixel or pixels in the fragment do not need to be rendered and can be discarded) (Page 4, section 32 and 35).

Everitt further teaches "Stencil values are used to mask portions of the output image during rendering, and are used to render a variety of different effects, such as mirrors and shadows" (Section 17, lines 12-15). Everitt further discloses (Fig. 4) a stencil test unit (425) masks all or a portion of the fragment from rendering according to a stencil value stored in the stencil buffer (455) (Page 5, section 42).

Therefore, it would have been obvious to a person of ordinary skill in the art to use the stencil values of Everitt to mask the portions of the fragment image of Chen to render a variety of different effects, such as mirrors and shadows, which would affect the appearance value for the pixel.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Chen in view of Jouppi as applied to claim 1 above, and further in view of Duluk, Jr. (6,476,807)

Claim 4.

Chen further discloses (Fig. 1) a display controller (display chip 18) operative to provide the pixel appearance value to a display (20) (Page 1, section 16, lines 14-18).

Chen fails to disclose the back end circuit.

However, Duluk, Jr. teaches the back end circuit is used to provide the interface between the frame buffer and the computer display in a graphics processor system (Column 28, lines 21-32).

It would have been obvious to the person of ordinary skill in the art to use the back end circuit of Duluk, Jr. into the graphics processor of Chen since this is conventional in the art.

Response to Arguments

Applicant's arguments filed July 21, 2006 have been fully considered but they are not persuasive.

Rejection Under 35 U.S.C. 102

The rejection under 35 U.S.C. 102 with regard to claims 9 and 11-12 has been withdrawn since claims 9 and 11-12 have been withdrawn due to the non-elected invention II.

Rejection Under 35 U.S.C. 103 (Claims 1-5 and 7-8)

Applicant argues, at pages 7-8, with respect to Chen and Jouppi, by asserting that Chen and Jouppi fail to teach "wherein dropping the fragment data further includes assigning the fragment data to be dropped with a no color designation". The examiner respectfully disagrees.

Jouppi discloses (Figs. 4 and 5) a method for determining the appearance of a pixel (300), comprising:

receiving fragment data (301,302 and 400) for a pixel (300) to be rendered; storing the fragment data in the pixel memory (314); and

determining an appearance value for the pixel based on the stored fragment data, wherein (Fig. 5C) at least one of the stored fragment data (310) is dropped when the number of fragment data per pixel exceeds a threshold value (N=2). Fig. 5C shows the fragment triple data (410) replaces the fragment triple data (310). See column 7, lines 37-67; column 8, lines 21-28; and column 9, lines 26-37.

Jouppi further teaches dropping the fragment data with a no color designation (completely transparency) (Column 15, lines 28-33).

Therefore, it would have been obvious to the person of ordinary skill in the art to use the method of dropping a "no color" fragment data of Jouppi into the graphics processor of Chen to reduce the amount of time spent rendering the pixels and decreases the memory space for storing the fragment data.

Regarding to the Applicant's argument with respect to claims 2-5 and 7-8, note the rejections as set forth above.

(10) Response to Argument

Applicant's arguments filed 12/17/2007 have been fully considered but they are not persuasive.

ARGUMENT A. THE OBVIOUSNESS REJECTIONS UNDER 35 U.S.C. § 103(a) TO CLAIMS 1-3, 4-5 AND 7 MUST BE REVERSED BECAUSE THE PUBLICATIONS

DO NOT TEACH OR SUGGEST WHAT IS ALLEGED, AND THE OFFICE ACTION MISCHARACTERIZES WHAT IS CLAIMED

Claim 1 recites an apparatus comprising: a rasterizer operative to generate fragment data for a pixel to be rendered in response to primitive information; and a pixel appearance determination circuit, coupled to the rasterizer, operative to determine a pixel appearance value based on the fragment data by dropping the fragment data having the least effect on pixel appearance, wherein dropping the fragment data further includes assigning the fragment data to be dropped with a no color designation.

(Emphasis added). The final Office action mailed December 28, 2006 ("Final Office Action") alleges that Chen discloses all aspects of Appellant's claim 1 but that "Chen fails to disclose the dropping the fragment data with a 'no color' designation." (Final Office Action at p. 2). Appellant agrees that Chen fails to disclose assigning the fragment data to be dropped with a no color designation.

Appellant argues Jouppi does not appear to assign any such no color designation but rather utilizes a pre-existing alpha value to discard fragment data. Jouppi discloses in col. 5, lines 33-38, the opacity of the fragment is expressed by the value stored in the alpha channel, and further that a 0 value indicates the fragment is invisible. Jouppi discloses storing fragment data for each pixel to determine the color value. Jouppi discloses the pixel memory can be initialized to contain a default fragment value, which represents when no fragments cover a particular sub pixel or when all fragments are transparent. Jouppi further discloses that each pixel could store a special index value that pointed to the default fragment, col. 6, lines 1-10.

Appellant argues whereas Jouppi is limited to the mere discardation based on previously existing alpha-value identification and that Appellant's application instead assigns the dropped fragment data with a no color designation. Examiner disagrees. Jouppi discloses in abstract that various strategies may be used to determine which fragment value is discarded. (Emphasis added). Jouppi discloses that a fragment is determined to be visible, when the new fragment has an Alpha value of 0.0. In this instance the new fragment is completely transparent. The graphics accelerator, 108 does not need to store the fragment value for the new fragment because the new fragment is, in effect, invisible. (Col. 15, 11.25- 33) (Emphasis added). Jouppi also explains that a fragment may be invisible if it is completely behind another non-transparent fragment, and a variety of strategies or techniques may be used to determine which visible fragment triple in memory should be discarded by replacement. It is therefore the position of the Examiner that Jouppi discloses dropping the fragment data having the least effect on pixel appearance and assigning a no color designation default value when no fragments cover a particular sub pixel sample or are transparent.

Applicant argues that a no color designation is not taught because Jouppi discloses using an existing alpha value to determine whether a fragment is invisible instead of assigning the fragment to be dropped a "no color designation". The cited portion of Jouppi discloses a new fragment with an alpha value of 0, and the new fragment is completely transparent, therefore no color is designated for the fragment." Appellant disagrees. Appellant notes that there is a difference between: (1) identifying fragments that are already associated with an alpha value of 0.0 (i.e., identifying

invisible fragments) and discarding these fragments before subsequent processing of fragment data to determine a pixel color as taught by Jouppi; and (2) Appellant's claimed feature of determining a pixel appearance value based on fragment data by dropping the fragment data having the least effect on pixel appearance, wherein dropping the fragment data further includes assigning the fragment data to be dropped with a no color designation."

Jouppi discloses storing fragment data for each pixel to determine the color value. Jouppi discloses the pixel memory can be initialized to contain a default fragment value, which represents when no fragments cover a particular sub pixel or when all fragments are transparent. Jouppi further discloses that each pixel could store a special index value that pointed to the default fragment, col. 6, lines 1-10.

Claim 8 stands rejected under 35 U.S.C. § 103(a) as allegedly being unpatentable over Chen in view of Jouppi and further in view of Everitt et al. (U.S. Publication No. 2004/0169651) ("Everitt").

Claim 8 is dependent upon independent claim 1 and further requires additional limitations as set for the below.

wherein the pixel appearance determination circuit is further operative to determine whether the fragment data includes masked sample data, wherein the masked sample data is not dropped, and wherein the masked sample data is used to determine the pixel appearance value.

Appellant argues that the Examiner ignores claim language and because Everitt appears to teach an opposite approach than the claimed subject matter. Conversely, if

the pixel's stencil value is not 0 (i.e., masked) then the color (presumably in the color buffer) is left unchanged. (Id.). "Essentially, the non-zero stencil buffer values 'mask' pixels inside one or more shadow volumes from being illuminated by the light source, creating a realistic shadow." (Id.). First, the Final Office Action fails to address claim limitations. For instance, Appellant's claim 8 expressly requires that the pixel appearance determination circuit is further "operative to determine whether the fragment data includes masked sample data." (Emphasis added). A reading of the rejection (published above) in the Final Office Action makes clear that the Examiner wholly failed to address this claim limitation.

However, Everitt discloses (Figs. 1 and 4) a graphics processor having a rasterization pipeline (400) for determining a pixel appearance value (depth value) based on the fragment data by dropping the fragment data having the least effect on pixel appearance (if the depth values are outside the depth bounds, then the pixel or pixels in the fragment do not need to be rendered and can be discarded) (Page 4, section 32 and 35). Everitt further teaches "Stencil values are used to mask portions of the output image during rendering, and are used to render a variety of different effects, such as mirrors and shadows" (Section 17, lines 12-15). Everitt further discloses (Fig. 4) a stencil test unit (425) masks all or a portion of the fragment from rendering according to a stencil value stored in the stencil buffer (455) (Page 5, section 42). Therefore it is the position of the Examiner that Everitt discloses determining whether the fragment data includes masked sample data.

Second, Appellant argues that if the combination of Chen, Jouppi and Everitt taught or suggested determining whether the fragment data includes masked sample data, a position not taken by Appellant, the combination fails to teach or suggest not dropping the masked sample data and using the masked sample data to determine the pixel appearance value. It is the interpretation of the Examine that Everitt discloses determining whether the fragment data includes mask data, wherein the masked data is not dropped, (paragraph 0026, if the stencil values associated with a pixel is not zero step 330 leaves the color values for this pixel unchanged and the non-zero values mask pixels inside one or more shadow volumes.

Lastly, Appellants note that the Supreme Court standard of obviousness set forth in Graham v. John Deere Co. requires the Office to, among other things: (1) resolve the level of ordinary skill in the pertinent art; and (2) evaluate evidence of secondary considerations. MPEP § 2141. Appellants submit that neither the Final Office Action nor the Advisory Action meets this threshold as no level of ordinary skill in the pertinent art was resolved and no evidence of secondary considerations have been considered by the Office. For this reason alone, the rejections must be reversed.

In response to applicant's argument that Examiner fails to (1) resolve the level of ordinary skill in the pertinent art; and (2) evaluate evidence of secondary considerations the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the

test is what the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

(11) Related Proceeding(s) Appendix

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Motilewa Good-Johnson/

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